

## **R655-4-1. Purpose, Scope, and Exclusions**

### **1.1 Purpose**

These rules are promulgated pursuant to Section 73-3-25. The purpose of these rules is to assist in the orderly development of underground water; insure that minimum construction standards are followed in the drilling, construction, deepening, repairing, renovating, cleaning, development, and abandonment of water wells and other regulated wells; prevent pollution of aquifers within the state; prevent wasting of water from flowing wells; obtain accurate records of well construction operations; and insure compliance with the state engineer's authority for appropriating water.

All administrative procedures involving applications, approvals, hearings, notices, revocations, orders and their judicial review, and all other administrative procedures required or allowed by these rules are governed by R655-6 "Administrative Procedures for Informal Proceedings Before the Division of Water Rights".

### **1.2 Scope**

The drilling, construction, deepening, repair, renovation, replacement, cleaning, development, or abandonment of the following types of wells is regulated by these administrative rules and the work must be completed by a licensed well driller. The rules contained herein pertain only to work on the well itself. These rules do not regulate the incidental work around the well such as pump and motor installation and repair; plumbing, electrical, and excavation work up to the well; and the building of well enclosures unless these activities directly impact or change the construction of the well itself. The process for an applicant to obtain approval to construct, or replace the wells listed below in 1.2.1, 1.2.2, or 1.2.3 is outlined in R655-4-7 of these rules. The process for an applicant to obtain approval to construct, deepen, repair, clean, or replace the wells listed below in 1.2.4, 1.2.5, or 1.2.6 is outlined in Appendix 1.

1.2.1 Cathodic protection wells.

1.2.2 Heating or cooling exchange wells which are 30 feet or greater in depth and which encounter formations containing groundwater. If a separate well or borehole is required for re-injection purposes, it must also comply with these administrative rules.

1.2.3 Monitor wells which are completed to a depth of 30 feet or greater.

1.2.4 Private water production wells which are completed to a depth of 30 feet or greater.

1.2.5 Public water system supply wells.

1.2.6 Recharge and recovery wells which are drilled under the provisions of Section 73-3b "Groundwater Recharge and Recovery Act" Utah Code Annotated.

### **1.3 Exclusions**

The construction, repair, replacement, or abandonment of the following types of wells or boreholes are excluded from regulation under these administrative rules:

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- 1.3.1 Any cathodic protection wells, heating or cooling exchange wells, monitor wells and water production wells that are constructed to a final depth of less than 30 feet. However, diversion and beneficial use of groundwater from wells less than 30 feet deep shall require approval through the appropriation procedures and policies of the state engineer and Section 73-3 of the Utah Code Annotated.
- 1.3.2 Geothermal wells. Although not regulated under the Administrative Rules for Water Well Drillers, geothermal wells are subject to Section 73-22-1 “Utah Geothermal Resource Conservation Act” Utah Code Annotated and the rules promulgated by the state engineer including Section R655-1, Wells Used for the Discovery and Production of Geothermal Energy in the State of Utah.
- 1.3.3 Temporary exploratory wells drilled to obtain information on the subsurface strata on which an embankment or foundation is to be placed or an area proposed to be used as a potential source of material for construction.
- 1.3.4 Wells or boreholes constructed to monitor man-made structures, house instrumentation to monitor structural performance, or dissipate hydraulic pressures on structures provided the wells or boreholes do not interfere with established aquifers or their primary purpose is not for monitoring water quality.
- 1.3.5 Wells or boreholes drilled or constructed into non-water bearing zones or which are less than 30 feet in depth for the purpose of utilizing heat from the surrounding earth.
- 1.3.6 Geotechnical borings drilled ~~for Preliminary Site Assessment (PSA) or~~ to obtain lithologic data which are not installed for the purpose of utilizing or monitoring groundwater.

## **R655-4-2. Definitions**

**ABANDONED WELL** - any well which is not in use and has been filled or plugged so that it is rendered unproductive and will prevent contamination of groundwater. A properly abandoned well will not produce water nor serve as a channel for movement of water from the well or between water bearing zones.

**AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)** - a nationally recognized testing laboratory that certifies building products and adopts standards including those for steel and plastic (PVC) casing utilized in the well drilling industry. ANSI standards are often adopted for use by ASTM & AWWA. Current information on standards can be obtained from: ANSI, 1430 Broadway, New York, NY 10018.

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)** - an independent organization concerned with the development of standards on characteristics and performance of materials, products and systems including those utilized in the well drilling industry. Information may be obtained from: ASTM, 1916 Race Street, Philadelphia, PA 19013.

**AMERICAN WATER WORKS ASSOCIATION (AWWA)** - an international association which publishes standards intended to represent a consensus of the water supply industry that the product or procedure described in the standard will provide satisfactory service or results. Information may be obtained from: AWWA, 6666 West Quincy Avenue, Denver CO 80235.

**ANNULAR SPACE** - the space between the inner well casing and the outer well casing or borehole.

~~**APPRENTICE** - an apprentice drill rig operator is an individual who is employed by a licensed Utah Water Well Driller; who works under the direct supervision of the licensee or a drill rig operator; who assists with, but never has responsible charge for the construction of water wells; and who uses equipment that is under the direct control of the licensee.~~

**AQUIFER** - a porous underground formation yielding withdrawable water.

**ARTESIAN AQUIFER** - a water-bearing formation which contains underground water under sufficient pressure to rise above the zone of saturation.

**ARTESIAN WELL** - a well where the water level rises appreciably above the zone of saturation.

**BENTONITE** - a highly plastic, highly absorbent, colloidal swelling clay composed largely of mineral sodium montmorillonite. Bentonite is commercially available in powdered, granular, tablet, pellet, or chip form which is hydrated with potable water and used for a variety of purposes including the stabilization of borehole walls during drilling, the control of potential or existing high fluid pressures encountered during drilling below a water table, well abandonment, and to provide a seal in the annular space between the

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well casing and borehole wall.

**BENTONITE GROUT** - a mixture of bentonite and potable water specifically designed to seal and plug wells and boreholes mixed at manufacturer's specifications to a grout consistency which can be pumped through a pipe directly into the annular space of a well or used for abandonment. Its primary purpose is to seal the borehole or well in order to prevent the subsurface migration or communication of fluids.

**CASH BOND** – A type of well driller bond in the form of a certificate of deposit (CD) submitted and assigned to the State Engineer by a licensed driller to satisfy the required bonding requirements.

**CASING** - a tubular retaining and sealing structure that is installed in the borehole to maintain the well opening.

**CATHODIC PROTECTION WELL** - a well constructed for the purpose of installing deep anodes to minimize or prevent electrolytic corrosive action of metallic structures installed below ground surface, such as pipelines, transmission lines, well casings, storage tanks, or pilings.

**CONFINING UNIT** - a geological layer either of unconsolidated material, usually clay or hardpan, or bedrock, usually shale, through which virtually no water moves.

**CONSOLIDATED FORMATION** - bedrock consisting of sedimentary, igneous, or metamorphic rock (e.g. shale, sandstone, limestone, quartzite, conglomerate, basalt, granite, tuff, etc.).

**DISINFECTION** - or disinfecting is the use of chlorine or other disinfecting agent or process approved by the state engineer, in sufficient concentration and contact time adequate to inactivate coliform or other organisms.

**DRAWDOWN** - the difference in elevation between the static and pumping water levels.

**DRILL RIG** - any power-driven percussion, rotary, boring, coring, digging, jetting, or augering machine used in the construction of a well or borehole.

**EMERGENCY SITUATION** - any situation where immediate action is required to protect life or property. Emergency status would also extend to any situation where life is not immediately threatened but action is needed immediately and it is not possible to contact the state engineer for approval. For example, it would be considered an emergency if a domestic well needed immediate repair over a weekend when the state engineer's offices are closed.

**GRAVEL PACKED WELL** - a well in which filter material is placed in the annular space to increase the effective diameter of the well and to prevent fine-grained sediments from entering the well.

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**GROUNDWATER** - subsurface water in a zone of saturation.

**GROUT** - a fluid mixture of Portland cement or bentonite with water of a consistency that can be forced through a pipe and placed as required. Various additives such as sand, bentonite, and hydrated lime may be included in the mixture to meet different requirements.

**HYDRAULIC FRACTURING** - the process whereby water or other fluid is pumped under high pressure into a well to fracture and clean-out the reservoir rock surrounding the well bore thus increasing the flow to the well.

**MONITOR WELL** - a well, as defined under “well” in this section, that is constructed for the purpose of determining water levels, monitoring chemical, bacteriological, radiological, or other physical properties of ground water or vadose zone water.

**NATIONAL SANITATION FOUNDATION (NSF)** - a voluntary third party consensus standards and testing entity established under agreement with the U. S. Environmental Protection Agency (EPA) to develop testing and adopt standards and certification programs for all direct and indirect drinking water additives and products.

Information may be obtained from: NSF, 3475 Plymouth Road, PO Box 1468, Ann Arbor, Michigan 48106.

**NEAT CEMENT GROUT** - cement conforming to the ASTM Standard C150 (standard specification of Portland cement), with no more than six gallons of water per 94 pound sack (one cubic foot) of cement of sufficient weight density of not less than 15 lbs/gallon.

**OPERATOR** - a drill rig operator is an individual who works under the direct supervision of a licensed Utah Water Well Driller and who can be left in responsible charge to construct water wells using equipment that is under the direct control of the licensee.

**PITLESS ADAPTER OR UNIT** - an assembly of parts designed for attachment to a well casing which allows buried pump discharge from the well and allows access to the interior of the well casing for installation or removal of the pump or pump appurtenances, while preventing contaminants from entering the well. Such devices protect the water and distribution lines from temperature extremes, permit extension of the casing above ground as required in Section R655-4-9.3.2 and allow access to the well, pump or system components within the well without exterior excavation or disruption of surrounding earth or surface seal.

**POLLUTION** - the alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water that renders the water harmful, detrimental, or injurious to humans, animals, vegetation, or property, or to public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any or reasonable purpose.

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POTABLE WATER - water supplied for human consumption, sanitary use, or for the preparation of food or pharmaceutical products which is free from biological, chemical, physical, and radiological impurities.

PRESSURE GROUTING - a process by which grout is confined within the drillhole or casing by the use of retaining plugs or packers and by which sufficient pressure is applied to drive the grout slurry into the annular space or zone to be grouted.

PRIVATE WATER PRODUCTION WELL - a privately owned well constructed to supply water for any purpose which has been approved by the state engineer (such as irrigation, stockwater, domestic, commercial, industrial, etc.).

PROBATION – A disciplinary action that may be taken by the state engineer that entails greater review and regulation of well drilling activities but which does not prohibit a well driller from engaging in the well drilling business or operating well drilling equipment.

PROVISIONAL WELL - authorization granted by the state engineer to drill under a pending, unapproved water right or exchange; or for the purpose of determining characteristics of an aquifer, or the existence of a useable groundwater source.

PUBLIC WATER SYSTEM SUPPLY WELL - a well, either publicly or privately owned, providing water for human consumption and other domestic uses which has at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days out of the year.

PUMPING LEVEL - the elevation of the surface of the water in a well after a period of pumping at a given rate.

REVOCATION – A disciplinary action that may be taken by the state engineer that rescinds the well driller's Utah Water Well Driller's License

SAND - a material having a prevalent grain size ranging from 2 millimeters to 0.06 millimeters.

SAND CEMENT GROUT - a grout consisting of equal parts of cement conforming to ASTM standard C150 and sand/aggregate with no more than six (6) gallons of water per 94 pound sack (one cubic foot) of cement.

STANDARD DIMENSION RATIO (SDR) - the ratio of average outside pipe diameter to minimum pipe wall thickness.

STATE ENGINEER - the director of the Utah Division of Water Rights or any employee of the Division of Water Rights designated by the state engineer to act in administering these rules.

STATIC LEVEL - stabilized water level in a non-pumped well beyond the area of

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influence of any pumping well.

SURETY BOND - an indemnity agreement in a sum certain and payable to the state engineer, executed by the licensee as principal and which is supported by the guarantee of a corporation authorized to transact business as a surety in the State of Utah.

SUSPENSION - A disciplinary action that may be taken by the state engineer that prohibits the well driller from engaging in the well drilling business or operating well drilling equipment as a registered operator for a definite period of time and /or until certain conditions are met.

TREMIE PIPE - a device that carries materials to a designated depth in a drill hole or annular space.

UNCONSOLIDATED FORMATION - loose, soft, incoherent rock material composed of sedimentary, igneous, or metamorphic rock which includes sand, gravel, and mixtures of sand and gravel. These formations are widely distributed and can possess good water storage and transmissivity characteristics.

UNHYDRATED BENTONITE - dry bentonite consisting primarily of granules, tablets, pellets, or chips that may be placed in a well or borehole in the dry state and hydrated in place by either formation water or by the addition of potable water into the well or borehole containing the dry bentonite. Unhydrated bentonite can be used for sealing and abandonment of wells.

VADOSE ZONE - the zone containing water under less than atmospheric pressure, including soil water, intermediate vadose water and capillary water. The zone extends from land surface to the zone of saturation or water table.

WELL - a horizontal or vertical excavation or opening into the ground made by digging, boring, drilling, jetting, augering, or driving or any other artificial method for utilizing or monitoring underground waters.

WELL DRILLER - any person who is licensed by the state engineer to construct water wells for compensation or otherwise. The licensed driller has total responsibility for the construction work in progress at the well drilling site.

WELL DRILLER BOND - A financial guarantee to the state engineer, in the form of a surety bond or cash bond, by which a licensed driller binds himself to pay the penal sum of \$5,000 to the state engineer in the event of significant noncompliance with the Administrative Rules for Water Well Drillers.

WELL DRILLING - the act of ~~drilling, constructing, repairing, renovating, or deepening, cleaning, developing, or abandoning~~ a well, including all incidental work.

## R655-4-3. Licenses and Registrations

### 3.1 General

- 3.1.1 Section 73-3-25 of the Utah Code requires every person that constructs a well in the state to obtain a license from the state engineer. Licenses, and registrations ~~and listings~~ are not transferable. ~~All licenses, registrations, and listings expire at 12 midnight on December 31 of the year in which they are issued.~~
- 3.1.2 Any person found to be drilling a well without a valid well driller's license or operator's registration will be ordered to cease drilling by the state engineer. The order may be made verbally but must also be followed by a written order. The order may be posted at an unattended well drilling site. A person found drilling without a license will be prosecuted under Section 73-3-26 of the Utah Code annotated, 1953. (See Appendix 2 Selected Water Laws of Utah)

### 3.2 Well Driller's License

An applicant must meet the following requirements to become licensed as a Utah Water Well Driller:

- 3.2.1 Applicants must be 21 years of age or older.
- 3.2.2 Complete and submit the application form provided by the state engineer.
- 3.2.3 Pay the application fee approved by the state legislature.
- 3.2.4 Provide documentation of at least two (2) years of full time prior water well drilling experience **OR** documentation of 15 wells constructed by the applicant under the supervision of a licensed well driller. A copy of the well log for each well constructed must be included. The documentation must also show the applicant's experience with each type of drilling rig to be listed on the license. Acceptable documentation will include registration with the Division of Water Rights, letters from licensed well drillers (Utah or other states), or a water well drilling license granted by another state, etc.

Successful completion of classroom study in geology, well drilling, map reading, and other related subjects may be substituted for up to, but not exceeding, 12 months of drilling experience, and for up to, but not exceeding, five (5) of the required drilled wells. The state engineer will determine the number of months of drilling experience and the number of drilled wells that will be credited for the classroom study.

- 3.2.5 ~~File a bond in the sum of \$5,000 with the Division of Water Rights which is conditioned upon proper compliance with the law and these rules and which is effective for the calendar year in which the license is to be issued. The bond shall stipulate the obligee as the "Office of the State Engineer".~~ File a well driller bond in the sum of \$5,000 with the Division of Water Rights payable to the state



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engineer. The well driller bond must be filed under the conditions and criteria described in Section 4-3.6.

- 3.2.6 Obtain a score of at least 70% on each of the written licensing examinations required and administered by the state engineer. The required examinations test the applicant's knowledge of:
  - a. The Administrative Rules for Water Well Drillers and Utah water law as it pertains to underground water;
  - b. The minimum construction standards established by the state engineer for water well construction;
  - c. Geologic formations and proper names used in describing underground material types;
  - d. Reading maps and locating points from descriptions based on section, township, and range;
  - e. Groundwater geology and the occurrence and movement of groundwater;
  - f. The proper operating procedures and construction methods associated with the various types of water well drilling rigs. (A separate test is required for each type of water well drilling rig to be listed on the license).
- 3.2.7 Demonstrate proficiency in resolving problem situations that might be encountered during the construction of a water well by passing an oral examination administered by the state engineer.

### **3.3 Drill Rig Operator's Registration**

An applicant must meet the following requirements to become registered as a drill rig operator:

- 3.3.1 Applicants must be 18 years of age or older.
- 3.3.2 Complete and submit the application form provided by the state engineer.
- 3.3.3 Pay the application fee approved by the state legislature.
- 3.3.4 Provide documentation of at least six (6) months of prior water well drilling experience. The documentation must show the applicant's experience with each type of drilling rig to be listed on the registration. Acceptable documentation will include ~~being listed as an apprentice with the Division of Water Rights,~~ letters from licensed well drillers; or registration as an operator in another state.
- 3.3.5 Obtain a score of at least 70% on a written examination of the minimum construction standards established by the state engineer for water well construction. The test will be provided to the licensed well driller by the state engineer. The licensed well driller will administer the test to the prospective operator and return it to the state engineer for scoring.

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### ~~3.4 Apprenticeship Listing~~

~~An applicant must meet the following requirements to become listed as an apprentice drill rig operator:~~

#### ~~3.4.1 Applicants must be 18 years of age or older.~~

#### ~~3.4.2 Complete and submit the application form provided by the state engineer.~~

### 3.45 Conditional, Restricted, or Limited Licenses

The state engineer may issue a restricted, conditional, or limited license to an applicant based on prior drilling experience.

### 3.56 Refusal to Issue a License or Registration

The state engineer may, upon investigation and after a hearing, refuse to issue a license or a registration to an applicant if it appears the applicant has not had sufficient training or experience to qualify as a competent well driller or operator.

## 3.6 Well Driller Bond

### 3.6.1 General

3.6.1.1. In order to become licensed and to continue licensure, a well driller must file a well driller bond in the form of a surety bond or cash bond, approved by the state engineer, in the sum of five thousand dollars (\$5,000) with the Division of Water Rights, on a form provided by the Division, which is conditioned upon proper compliance with the law and these rules and which is effective for the licensing period in which the license is to be issued. The bond shall stipulate the obligee as the "Office of the State Engineer". The well driller bond is penal in nature and is designed to ensure compliance by the licensed well driller to protect the groundwater resource, the environment, and public health and safety. The bond may only be exacted by the state engineer for the purposes of investigating, repairing, or abandoning wells in accordance with applicable rules and standards. No other person or entity may initiate a claim against the well driller bond. Lack of a current and valid well driller bond shall be deemed sufficient grounds for denial of a driller's license. The well driller bond may consist of a surety bond or a cash bond as described below.

### 3.6.2 Surety Bonds

3.6.2.1. The licensed well driller and a surety company or corporation authorized to do business in the State of Utah as surety shall bind themselves and their successors and assigns jointly and severally to the state engineer for the use and benefit of the public in full penal sum of five thousand dollars (\$5,000). The

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surety bond shall specifically cover the licensee's compliance with the Administrative Rules for Water Well Drillers found in R655-4 of the Utah Administrative Code. Forfeiture of the surety bond shall be predicated upon a failure to drill, construct, repair, renovate, deepen, clean, develop, or abandon a regulated well in accordance with these rules (R655-4 UAC). The bond shall be made payable to the 'Utah State Engineer' upon forfeiture. The surety bond must be effective and exactable in the State of Utah.

3.6.2.2. The bond and any subsequent renewal certificate shall specifically identify the licensed individual covered by that bond. The licensee shall notify the state engineer of any change in the amount or status of the bond. The licensee shall notify the state engineer of any cancellation or change at least thirty (30) days prior to the effective date of such cancellation or change. Prior to the expiration of the 30-days notice of cancellation, the licensee shall deliver to the state engineer a replacement surety bond or transfer to a cash bond. If such a bond is not delivered, all activities covered by the license and bond shall cease at the expiration of the 30 day period. Termination shall not relieve the licensee or surety of any liability for incidences that occurred during the time the bond was in force.

3.6.2.3. Before the bond is forfeited by the licensed driller and exacted by the state engineer, the licensed driller shall have the option of resolving the noncompliance to standard either by personally doing the work or by paying to have another licensed driller do the work. If the driller chooses not to resolve the problem that resulted in noncompliance, the entire bond amount of five thousand dollars (\$5,000) shall be forfeited by the surety and expended by the state engineer to investigate, repair or abandon the well(s) in accordance with the standards in R655-4 UAC. Any excess there from shall be retained by the state engineer and expended for the purpose of investigating, repairing, or abandoning wells in accordance with applicable rules and standards. All claims initiated by the state engineer against the surety bond will be made in writing.

3.6.2.4. The bond of a surety company that has failed, refused or unduly delayed to pay, in full, on a forfeited bond is not approvable.

### 3.6.3 Cash Bonds

3.6.3.1. The requirements for the well driller bond may alternatively be satisfied by a cash bond in the form of a certificate of deposit (CD) for the amount of five thousand dollars (\$5,000) issued by a federally insured bank or credit union with an office(s) in the State of Utah. The cash bond must be in the form of a CD. Savings accounts, checking accounts, letters of credit, etc., are not acceptable cash bonds. The CD shall specifically identify the licensed individual covered by that fund. The CD shall be automatically renewable and fully assignable to the state engineer. CD shall state on its face that it is automatically renewable.

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3.6.3.2. The cash bond shall specifically cover the licensee's compliance with well drilling rules found in R655-4 of the Utah Administrative Code. The CD shall be made payable or assigned to the state engineer and placed in the possession of the state engineer. If assigned, the state engineer shall require the bank or credit union issuing the CD to waive all rights of setoff or liens against those CD. The CD, if a negotiable instrument, shall be placed in the state engineer's possession. If the CD is not a negotiable instrument, the CD and a withdrawal receipt, endorsed by the licensee, shall be placed in the state engineer's possession.

3.6.3.3. The licensee shall submit CDs in such a manner which will allow the state engineer to liquidate the CD prior to maturity, upon forfeiture, for the full amount without penalty to the state engineer. Any interest accruing on a CD shall be for the benefit of the licensee.

3.6.3.4. The period of liability for a cash bond is five (years) after the expiration, suspension, or revocation of the license. The cash bond will be held by the state engineer until the five year period is over, then it will be relinquished to the licensed driller. In the event that a cash bond is replaced by a surety bond, the period of liability, during which time the cash bond will be held by the state engineer, shall be five (5) years from the date the new surety bond becomes effective.

### 3.6.4 Exacting a Well Driller Bond

3.6.4.1. If the state engineer determines, following an investigation and a hearing in accordance with the process defined in Section 4-5, that the licensee has failed to comply with the Administrative Rules for Water Well Drillers and refused to remedy the noncompliance, the state engineer may suspend or revoke a well driller's license and fully exact the well driller bond and deposit the money as a non-lapsing dedicated credit.

3.6.4.2. The state engineer may expend the funds derived from the bond to investigate or correct any deficiencies which could adversely affect the public interest resulting from non-compliance with the Administrative Rules by any well driller.

3.6.4.3. The state engineer shall send written notification by certified mail, return receipt requested, to the licensee and the surety on the bond, if applicable, informing them of the determination to exact the well driller bond. The state engineer's decision regarding the noncompliance will be attached to the notification which will provide facts and justification for bond exaction. In the case of a surety bond exaction, the surety company will then forfeit the total bond amount to the state engineer. In the case of a cash bond, the state engineer will cash out the CD. The exacted well driller bond funds may then be used by the state engineer to cover the costs of well investigation, repair, and/or abandonment.

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## **R655-4-4. Administrative Requirements and General Procedures**

### **4.1 Authorization to Drill**

The well driller shall make certain that a valid authorization or approval to drill exists before beginning drilling or work on a well. ~~A valid~~ Authorization to drill shall consist of a valid 'start card' based on any of the items approvals listed below. **Items 4.1.1 through 4.1.7~~11~~ allow the applicant to contract with a well driller to drill, replace, renovate, or abandon exactly one well at each location listed on the start card or approval form. The drilling of multiple borings/wells at an approved location/POD is not allowed without authorization from the state engineer's office. Most start cards list the date when the authorization to drill expires. If the expiration date has passed, the start card is no longer valid. If there is no expiration date on the start card, the driller must contact the state engineer's office to determine if the authorization to drill is still valid. When the work is completed, the permission to drill is terminated.**

4.1.1 An approved application to appropriate.

4.1.2 A provisional well approval letter.

An approved provisional well letter grants authority to drill but allows only enough water to be diverted to determine the characteristics of an aquifer or the existence of a useable groundwater source.

4.1.3 An approved permanent change application.

4.1.4 An approved exchange application.

4.1.5 An approved temporary change application.

4.1.6 An approved application to renovate or deepen an existing well.

4.1.7 An approved application to replace an existing well.

4.1.8 An approved monitor well letter.

An approved monitor well letter grants authority to drill but allows only enough water to be diverted to monitor groundwater.

4.1.9 An approved heat exchange well letter.

4.1.10 An approved cathodic protection well letter

4.1.11 Any letter or document from the state engineer directing or authorizing a well to be drilled or work to be done on a well.

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### **4.2 Start Cards**

- 4.2.1 **Prior to commencing any work (other than abandonment, see 4.2.4) on any well governed by these administrative rules, the driller must notify the state engineer of that intention by transmitting the information on the “Start Card” to the state engineer by telephone, by facsimile (FAX), by hand delivery, or by e-mail.** A completed original Start Card must be sent to the state engineer by the driller after it has been telephoned or E-mailed.
- 4.2.2 A specific Start Card is printed for each well drilling approval and is furnished by the state engineer to the applicant or the well owner. The start card is preprinted with the water right number/provisional/monitor well number, owner name/address, and the approved location of the well. The state engineer marks the approved well drilling activity on the card. The driller must put the following information on the card:
- a. The date on which work on the well will commence;
  - b. The projected completion date of the work;
  - c. The well driller’s license number;
  - d. The well driller’s signature.
- 4.2.3 When a single authorization is given to drill wells at more than one point of diversion, a start card shall be submitted for each location to be drilled.
- 4.2.4 A start card is not required to abandon a well. However, prior to commencing well abandonment work, the driller is required to notify the state engineer by telephone, by facsimile, or by e-mail of the proposed abandonment work. The notice must include the location of the well. The notice should also include the water right number associated with the well and the well owner if that information is available.

### **4.3 General Requirements During Construction**

- 4.3.1 The well driller shall have the required penal bond continually in effect during the term of the well driller’s license.
- 4.3.2 The well driller’s license number or the well driller’s company name exactly as shown on the well drilling license must be prominently displayed on each well drilling rig operated under the well driller’s license. If the well driller’s company name is changed the well driller must immediately inform the state engineer of the change in writing.
- 4.3.3 A licensed well driller or a registered operator must be at the well site whenever the following aspects of well construction are in process: advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved in well renovation or repair, or abandoning a well. All

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registered operators working under a well driller's license must be employees of the well driller and must use equipment either owned by or leased by the licensed well driller.

- 4.3.4 A registered operator who is left in responsible charge of advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved in well renovation or repair, or abandoning a well must have a working knowledge of the minimum construction standards and the proper operation of the drilling rig. The licensed well driller is responsible to ensure that a registered operator is adequately trained to meet these requirements. If, during a field inspection by the staff of the Division of Water Rights, it is determined that a registered operator in responsible charge does not meet these requirements, a state engineer's red tag (see Section 4.3.5) will be placed on the drilling rig and the drilling operation will be shut down. The order to cease work will remain effective until a qualified person is available to perform the work.
- 4.3.5 The state engineer or staff of the Division of Water Rights may order that work cease on the construction, repair, or abandonment of a well if a field inspection reveals that the construction does not meet the minimum construction standards to the extent that the public interest might be adversely affected. A cease work order may also be issued if the well driller is not licensed for the drilling method being used for the well construction. The state engineer's order will be in the form of a red tag which will be attached to the drilling rig. A letter from the state engineer will be sent to the licensed driller to explain the sections of the administrative rules which were violated. The letter will also explain the requirements that must be met before the order can be lifted.
- 4.3.6 When required by the state engineer, the well driller or registered operator shall take lithologic samples at the specified intervals and submit them in the bags provided by the state engineer.
- 4.3.7 A copy of the current Administrative Rules for Water Well Drillers should be available at each well construction site for review by the construction personnel.

### **4.4 Removing Drill Rig From Well Site.**

- 4.4.1 A well driller shall not remove his drill rig from a well site unless the well is completed or abandoned. Completion of a well shall include all surface seals, gravels packs, or curbs required.
- 4.4.2 For the purposes of these rules, the construction, repair or abandonment work on a well will be considered completed when the well driller removes his drilling rig from the well site.
- 4.4.3 The well driller may request a variance from the state engineer. The written



## **R655-4-4. Administrative Requirements and General Procedures**

request must indicate that the well has been temporarily abandoned as provided in R655-4-12 and must give the date when the well driller plans to continue work.

### **4.5 Official Well Driller's Report (Well Log)**

- 4.5.1 Within 30 days of the completion of work on any well, the driller shall file an official well driller's report (well log) with the state engineer. The blank well log form will be mailed to the licensed well driller upon receipt of the information on the Start Card as described in Section 4.2.
- 4.5.2 The water right number/provisional/monitor well number, owner name/address, and the approved location of the well will be preprinted on the blank well log provided to the well driller. The driller is required to verify this information and make any necessary changes on the well log prior to submittal. The state engineer will mark the approved activity (e.g., new, replace, repair, deepen) on the well log. The driller must provide the following information on the well log:
  - a. The start and completion date of work on the well;
  - b. The nature of use for the well (e.g., domestic, irrigation, stock watering, commercial, municipal, provisional, monitor, cathodic protection, heat pump, etc.);
  - c. The borehole diameter, depth interval, drilling method and drilling fluids utilized to drill the well;
  - d. The lithologic log of the well based on strata samples taken from the borehole as drilling progresses;
  - e. Static water level information to include date of measurement, static level, measurement method, reference point, artesian flow and pressure, and water temperature;
  - f. The size, type, description, joint type, and depth intervals of casing, screen, and perforations;
  - g. A description of the filter pack, surface and interval seal material, and packers used in the well along with necessary related information such as the depth interval, quantity, and mix ratio;
  - h. A description of the finished wellhead configuration;
  - i. The date and method of well development;
  - j. The date, method, yield, drawdown, and elapsed time of a well yield test;
  - k. A description of pumping equipment (if available);
  - l. Other comments pertinent to the well activity completed;
  - m. The well driller's statement to include the driller name, license number, signature, and date.
- 4.5.3 Accuracy and completeness of the submitted well log are required. Of particular importance is the lithologic section which should accurately reflect the geologic strata penetrated during the drilling process. Sample identification must be logged in the field as the borehole advances and the information transferred to the well log form for submission to the state engineer.
- 4.5.4 An amended well log shall be submitted by the licensed driller if it becomes

## **R655-4-4. Administrative Requirements and General Procedures**

known that the original report contained inaccurate or incorrect information, or if the original report requires supplemental data or information. Any amended well log must be accompanied by a written statement, signed and dated by the licensed well driller, attesting to the circumstances and the reasons for submitting the amended well log.

### **4.6 Official Well Abandonment Reports (Abandonment Logs)**

- 4.6.1 Whenever a well driller is contracted to replace an existing well under state engineer's approval, it shall be the responsibility of the well driller to inform the well owner that it is required by law to permanently abandon the old well in accordance with the provisions of R655-4-12.
- 4.6.2 Within 30 days of the completion of abandonment work on any well, the driller shall file an abandonment log with the state engineer. The blank abandonment log will be mailed to the licensed well driller upon notice to the state engineer of commencement of abandonment work as described in Section 4.2.4.
- 4.6.3 The water right number/provisional/monitor well number, owner name/address, and the well location (if available) will be preprinted on the blank abandonment log provided to the well driller. The driller is required to verify this information and make any necessary changes on the abandonment log prior to submitting the log. The driller must provide the following information on the abandonment log:
  - a. Existing well construction information;
  - b. Date of abandonment;
  - c. Reason for abandonment;
  - d. A description of the abandonment method;
  - e. A description of the abandonment materials including depth intervals, material type, quantity, and mix ratio;
  - f. Replacement well information (if applicable);
  - g. The well driller's statement to include the driller name, license number, signature, and date.
- 4.6.4 When a well is replaced and the well owner will not allow the driller to abandon the existing well, the driller must briefly explain the situation on the abandonment form and submit the form to the state engineer within 30 days of completion of the replacement well.

### **4.7 Incomplete or Incorrectly Completed Reports**

An incomplete well/abandonment log or a well/abandonment log that has not been completed correctly will be returned to the licensed well driller to be completed or corrected. The well log will not be considered filed with the state engineer until it is complete and correct.

### **4.8 Extensions of Time**

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The well driller may request an extension of time for filing the well log if there are circumstances which prevent the driller from obtaining the necessary information before the expiration of the 30 days. The extension request must be submitted in writing before the end of the 30-day period.

## R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards

### 5.1 List of Infractions and Points

Licensed well drillers who commit the infractions listed below in Table 1 shall have assessed against their well drilling record the number of points assigned to the infraction.

**Table 1**

<b>Infractions of Administrative Requirements</b>		<b>Points</b>
<b>Start Cards/Authorization</b>		
1.	Failure to properly notify the state engineer before the <u>proposed start date shown on the start card of construction</u> .....	20
2.	Performing any well drilling activity without valid authorization (except in emergency situations) .....	100
<b>Well Logs</b>		
3.	Intentionally making a material misstatement of fact in an official well driller's report or amended official well driller's report (well log) .....	100
4.	Well log submitted late .....	10
<b>Well Abandonment</b>		
5.	Well abandonment report submitted late .....	10
<b>Licenses</b>		
6.	Intentionally making a material misstatement of fact in the application for a well driller's license .....	100
7.	Well driller license or well driller name not clearly posted on well drilling rig .....	10
8.	Failing to notify the state engineer in a timely manner of a change in the well driller's company name .....	10
<b>Operators / Contract Drillers</b>		
9.	Employing an operator who is not registered with the state .....	75
10.	Contracting out work to an unlicensed driller (using the unlicensed driller's rig) without prior written approval from the state .....	75
<b>Infractions of Construction Standards / Conditions</b>		<b>Points</b>
<b>Approvals</b>		
11.	Constructing a replacement well further than 150 ft from the original well without the authorization of an approved change application .....	50
12.	Failing to comply with any conditions included on the well approval such as minimum or maximum depths, specified locations of perforations, etc. ....	50
13.	Using a method of drilling not listed on the well driller's license .....	30
14.	Performing any well construction activity in violation of a red tag cease work order .....	100
<b>Casing</b>		
15.	Using or attempting to use sub-standard well casing .....	50
16.	Using improper casing joints .....	40

## **R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards**

17.	Failure to extend well casing at least 18" above ground .....	30
<b>Surface Seals</b>		
<del>18.</del>	<del>Using improper procedures to install a surface seal .....</del>	<del>50</del>
<del>19.</del>	<del>Using improper products to install a surface seal .....</del>	<del>50</del>
18.	Using improper products or procedures to install a surface seal .....	100
19.	Failure to seal off artesian flow on the outside of casing .....	100
20.	Failure to install surface seal to adequate depth based on formation type .....	100
<b>Well Abandonment</b>		
<del>201.</del>	<del>Using improper procedures to abandon a well .....</del>	<del>50</del>
<del>242.</del>	<del>Using improper products to abandon a well .....</del>	<del>50</del>
<b>Construction Fluids</b>		
<del>223.</del>	<del>Using water of unacceptable quality in the well drilling operation .....</del>	<del>40</del>
<del>234.</del>	<del>Using improper circulation materials .....</del>	<del>30</del>
<del>245.</del>	<del>Using an unacceptable mud pit .....</del>	<del>20</del>
<b>Filter Packs</b>		
<del>256.</del>	<del>Failure to install filter pack properly .....</del>	<del>40</del>
<del>267.</del>	<del>Failure to disinfect filter pack .....</del>	<del>30</del>
<b>Well Completion</b>		
<del>278.</del>	<del>Failure to make well accessible to water level or pressure head measurements .....</del>	<del>30</del>
<del>289.</del>	<del>Failure to install casing annular seals, cap, and valving, and to control artesian flow .....</del>	<del>30</del>
<del>2930.</del>	<del>Removing the well drilling rig from the well site before completing the well or temporarily or permanently abandoning the well .....</del>	<del>50</del>
<b>General</b>		
<del>301.</del>	<del>Failure to securely cover an unattended well during construction .....</del>	<del>30</del>

### **5.2 When Points Are Assessed**

Points will be assessed against a driller's record upon verification by the state engineer that an infraction has occurred. Points will be assessed at the time the state engineer becomes aware of the infraction regardless of when the infraction occurred.

### **5.3 Appeal of Infractions**

Well drillers may appeal each infraction in writing within 30 days of written notification by the state engineer.

### **5.4 Warning Letter**

When the number of points assessed against the well driller's record equals seventy five (75) points, a warning letter will be sent to the well driller. The letter will notify the driller that if he continues to violate the administrative requirements or minimum construction standards contained in the Administrative Rules for Water Well Drillers, a

## **R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards**

hearing will be held to determine if his license should be suspended or revoked or the bond exacted. The letter will also describe the options available to the driller to delete points from the record as described in Subsection 4-5.7. A copy of the driller's infraction record will be included with the letter. In the event numerous points are assessed against the well drillers record so that the total surpasses seventy-five (75) and one hundred (100) points at the same time, no warning letter will be sent.

### **5.5 ~~Hearings~~ Notice of Agency Action**

5.5.1 When the number of points assessed against the well driller's record equals 100, a Notice of Agency Action (NAA) will be sent to the well driller. The NAA will set forth the alleged facts, provide an opportunity for a response from the well driller, and provide notice of the a hearing ~~will be scheduled to consider whether the well driller's license should be suspended or revoked.~~ scheduled to consider the issues. The hearing will be scheduled at least 10 days from the date the NAA is mailed. The NAA will indicate the date, time, and place of the hearing. The state engineer will determine the duration of the revocation or suspension period.

~~5.6~~ 5.5.2 A NAA may also be sent and a hearing may also be convened as a result of a complaint filed by a well owner regardless of the total number of points shown on the well driller's record.

~~5.7~~ 5.5.3 A well driller will be given ten (10) days notice, by registered mail, of any hearing which is scheduled to consider suspending or revoking the well driller's license or exacting the well driller's bond. The purpose of the hearing will be to determine if disciplinary action is necessary regarding the water well driller's Utah Water Well License. The hearing will be conducted informally according to the rules adopted under Section 63-46b-4 and 63-45b-5. The hearing will be recorded. At the hearing, testimony will be taken under oath regarding the alleged facts included in the NAA. Those providing testimony may include the water well driller, the well owner, Division of Water Rights staff, and others as deemed necessary. Evidence that is pertinent to the alleged facts may also be presented at the hearing. After considering the testimony and the evidence presented at the hearing, the State Engineer may determine either that there is no cause for action against the well driller's license or that disciplinary action is necessary. Disciplinary action may consist of probation, suspension, or revocation of the Utah Water Well License.

### **5.6 License Probation, Suspension or Revocation**

~~5.8~~ 5.6.1 A well driller whose license has been revoked or suspended, will be prohibited from engaging in the well drilling business or operating well drilling equipment during the revocation or suspension period set by the state engineer. Probation will generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe first time infractions of the administrative rules that are limited in number and less serious in their impact on

## **R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards**

the well owner and on the health of the aquifer. The probation period will generally last until the number of infraction points on the well driller's record is reduced below 70 through any of the options described in Subsection 4-5.7.

~~5.9~~ 5.6.2 ~~After the suspension period has expired, the well driller will be notified by the state engineer that he/she may again engage in the well drilling business, however, there will be a probation period lasting until the total number of points on the well driller's infraction record is reduced through any of the options described in Subsection R655-4-5(5.10). Suspension will generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe repeated infractions of the administrative rules, or infractions that a pose serious threat to the health of the aquifer, or a well driller's apparent disregard for the administrative rules or the state's efforts to regulate water well drilling. Depending upon the number and severity of the rule infractions, the state engineer may elect to suspend a well driller license for a certain period of time and/or until certain conditions have been met by the well driller. In establishing the length of the suspension, the state engineer will generally follow the guideline that three infraction points is the equivalent of one day of suspension. A well driller whose license has been suspended will be prohibited from engaging in the well drilling business or operating well drilling equipment as a registered operator. License suspension may also result in the exaction of the Well Driller Bond as set forth in Subsection 4-3.6.4. A well driller whose license has been suspended is allowed to work as a helper under the direct, continuous, and on-site supervision of a licensed well driller or registered operator. If the suspension period extends beyond the expiration date of the water well license, the water well driller may not apply to renew the license until the suspension period has run and any conditions have been met. Once the suspension period has run and once any conditions have been met by the well driller, the suspension will be lifted and the driller will be notified that he/she may again engage in the well drilling business. The well driller will then be placed on probation until the number of infraction points on the well driller's record is reduced below 70 through any of the options described in Subsection 4-5.7.~~

~~5.10~~ 5.6.3 ~~Revocation will generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe infractions of the administrative rules for which the well driller's Utah Water Well License has previously been suspended. A well driller whose license has been revoked will be prohibited from engaging in the well drilling business or operating well drilling equipment as a registered operator. License suspension may also result in the exaction of the Well Driller Bond as set forth in Subsection 4-3.6.4. A well driller whose license has been revoked is allowed to work as a helper under the direct, continuous, and on-site supervision of a licensed well driller or registered operator. A well driller whose water well license has been revoked may not make application for a new water well license for a period of two years from the date of revocation. After the revocation period has run expired, a well driller may make application for a new license as provided in Subsection 4-3. However, the~~

## **R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards**

well drilling experience required must be based on new experience obtained since the license was revoked.

~~5.11~~5.7 Deleting Point from the Driller Record: Points assessed against a well driller's record will remain on the record unless deleted through any of the following options:

~~5.11.15~~5.7.1 Points will be deleted three years after the date when the infraction is noted by the state engineer and the points are assessed against the driller's record.

~~5.11.25~~5.7.2 One half the points on the record will be deleted if the well driller is free of infractions for an entire year.

~~5.11.35~~5.7.3 Thirty (30) points will be deleted for obtaining six (6) hours of approved continuing education credits in addition to the credits required to renew the water well driller's license. A driller may exercise this option only once each year.

~~5.11.45~~5.7.4 Twenty (20) points will be deleted for taking and passing (with a minimum score of 70%) the test covering the administrative requirements and the minimum construction standards. A driller may exercise this option only every other year.

### ~~5.12~~ Exacting the Driller Bond

~~5.12~~ If the state engineer determines, following an investigation and a hearing, that the licensee has failed to comply with the Administrative Rules for Water Well Drillers, the state engineer may exact the bond and deposit the money as a non-lapsing dedicated credit.

~~5.13~~ The state engineer may expend the funds derived from the bond to investigate or correct any deficiencies which could adversely affect the public interest resulting from non-compliance with the Administrative Rules by any well driller.

### ~~5.14~~ Operator Registration Suspension or Revocation

~~An operator's registration may be revoked or suspended for failure to comply with the minimum construction standards.~~

### ~~5.15~~5.8 Lack of Knowledge Not an Excuse

Lack of knowledge of the law or the administrative requirements and minimum construction standards related to well drilling shall not constitute an excuse for violation thereof.

### ~~5.16~~5.9 Misdemeanors

Section 73-3-26 of the Utah Code annotated, 1953, classifies certain actions as class B



## **R655-4-5. Infractions of the Administrative Requirements and the Minimum Construction Standards**

Misdemeanors. Each day that a violation continues is a separate offense. (Reference: Statutes Appendix B.)

## **R655-4-6. Renewal of Well Driller's License, and Operator's Registration, and Apprenticeship Listings**

### **6.1 Well Driller's Licenses.**

6.1.1 ~~All well driller's licenses expire at 12 midnight on December 31 of the year in which they are issued.~~ Water well driller licenses shall expire and be renewed according to the following provisions:

a. Between January 1, 2004 and June 30, 2006 water well driller licenses shall expire and be renewed according to the following schedule:

1. The licenses of water well drillers whose last name begins with A thru L shall not expire on December 31, 2004 but shall expire at 12 midnight on June 30, 2005. The continuation of the license will depend on documentation of a valid \$5,000 well driller bond for the period thru June 30, 2005. Well drillers whose licenses expire on June 30, 2005 and who meet the application requirements of R-655-4-6 (6.1.2) including the documentation of nine (9) continuing education credits, shall receive a license that expires on June 30, 2007.

2. The licenses of water well drillers whose last name begins with M thru Z shall expire at midnight on December 30, 2004. Well drillers whose last name begins with M thru Z and who meet the application requirements of R655-4-6 (6.1.2) shall receive a license that expires on June 30, 2006. The \$5,000 well driller bond must be valid for the period January 1, 2005 through June 30, 2006. Well drillers whose licenses expire on June 30, 2006 and who meet the application requirements of R-655-4-6 (6.1.2) including the documentation of nine (9) continuing education credits, shall receive a renewed license for the a 2 year period.

b. After June 30, 2005, the licenses of well drillers whose last name begins with A thru L shall expire at 12 midnight on June 30 of odd numbered years.

c. After June 30, 2006, the licenses of well drillers whose last name begins with M thru Z shall expire at 12 midnight on June 30 of even numbered years.

d. Drillers who meet the renewal requirements set forth in Subsection R655-4-6 (6.1.2) on or before ~~12 midnight December 31~~ the expiration deadlines set forth in Subsection R655-4-6 (6.1.1) shall be authorized to operate as a licensed well driller until the new license is issued.

e. Drillers must renew their licenses within 24 months of the license expiration date. Drillers failing to renew within 24 months of the license expiration date must re-apply for a well driller's license, and meet all the application requirements of Subsection R655-4-3(3.2), and provide documentation of 12 hours of continuing education according to the requirements of R655-4-6 (6.2) obtained within the previous 24 months.

6.1.2 Applications to renew a well driller's license must include the following items:

a. Payment of the license renewal fee determined and approved by the legislature;

## **R655-4-6. Renewal of Well Driller's License, and Operator's Registration, and Apprenticeship Listings**

- b. Written application to the state engineer;
- c. ~~Documentation of \$5,000 penal bond for the next calendar year~~ Documentation of continuing well driller bond coverage in the amount of five thousand dollars (\$5,000) penal bond for the next licensing period calendar year. The form and conditions of well driller bond shall be as set forth in Section 4.3. Allowable documentation can include bond continuation certificates and CD statements;
- d. Proper submission of all start cards, official well driller reports (well logs), and well abandonment reports for the current calendar year;
- e. Documentation of compliance with the continuing education requirements described in Section 6.2.1. Acceptable documentation of attendance at approved courses must include the following information: the name of the course, the date it was conducted, the number of approved credits, the name and signature of the instructor and the driller's name; for example, certificates of completion, transcripts, attendance rosters, diplomas, etc. (Note: drillers are advised that the state engineer will not keep track of the continuing education courses each driller attends during the year. Drillers are responsible to acquire and then submit documentation with the renewal application.)

6.1.3 License renewal applications that do not meet the requirements of Subsection R655-5-6(6.1.2) by ~~December 31~~ June 30 of the expiration year or which are received after ~~December 31~~ June 30 of the expiration year, will be assessed an additional administrative late fee determined and approved by the legislature.

~~6.1.7~~6.1.4 The state engineer may renew a license on a restricted, conditional, or limited basis according to the driller's performance and compliance with established rules and construction standards. The state engineer may refuse to renew a license to a well driller if it appears that there has been a violation of these rules or a failure to comply with Section 73-3-22 of the Utah Code.

### 6.2 Continuing Education

~~6.1.4~~6.2.1 During each license period ~~calendar year~~, licensed well drillers are required to earn at least twelve (12) ~~six (6)~~ continuing education credits by attending training sessions sponsored or sanctioned by the state engineer. Drillers who do not renew their licenses, but who intend to renew within the following 24 month period allowed in Section 6.1.1, are also required to earn twelve (12) ~~six (6)~~ continuing education credits.

~~6.1.5~~6.2.2 The state engineer shall establish a committee consisting of the state engineer or a representative, no more than four licensed well drillers, a ground water scientist, and a manufacturer/supplier of well drilling products. The committee will develop criteria for the training courses, approve the courses which can offer continuing education credits, and assign the number of credits to each course. The committee will make recommendations to the state engineer concerning appeals from training course sponsors and well drillers related to earning continuing education credit.

## **R655-4-6. Renewal of Well Driller's License, and Operator's Registration, and Apprenticeship Listings**

~~6.1.6.2.3~~ 6.2.3 The committee established in Section 6.2.2 shall assign the number of continuing education credits to each proposed training session based on the instructor's qualifications, a written outline of the subjects to be covered, and written objectives for the session. Well drillers wishing continuing education credit for other training sessions shall provide the committee with all information it needs to assign continuing education requirements.

6.2.4 Licensed drillers must complete a State Engineer-sponsored "Administrative Rules for Well Drillers" review course or other approved rules review once every four (4) years.

6.2.5 CE credits cannot be carried over from one licensing period to another.

### ~~6.2.6.3~~ Drill Rig Operator's Registration.

~~6.2.16.3.1~~ 6.2.3.1 All operator's registrations shall expire at 12 midnight on December 31 of the year in which they are issued the same time as the license of the well driller by whom they are employed. Operators who meet the renewal requirements set forth in Subsection R655-4-6(6.3.2) on or before 12 ~~midnight December 31~~ June 30 of the expiration year shall be authorized to act as a registered operator until the new registration is issued. Operators must renew their registrations within ~~12~~ 24 months of the registration expiration date. Operators failing to renew within ~~12~~ 24 months of the registration expiration date must re-apply for an operator's registration and meet all the application requirements of Subsection R655-4-3(3.3).

~~6.2.26.3.2~~ 6.2.3.2 Applications to renew an operator's registration must include the following items:  
a. Payment of the registration renewal fee determined and approved by the legislature;  
b. Written application to the state engineer.

~~6.2.36.3.3~~ 6.2.3.3 Registration renewal applications that do not meet the requirements of Subsection R655-4- 6(6.3.2) by the June 30 expiration date or that are received after the ~~December 31~~ June 30 expiration date will be assessed an additional administrative late fee determined and approved by the legislature.

~~6.2.46.3.4~~ 6.2.3.4 During each ~~calendar year~~ licensing period, it is **suggested** that registered operators earn at least ~~three (3)~~ six (6) continuing education credits by attending training sessions sponsored or sanctioned by the state engineer. Documented continuing education credits may be allowed as substitute for drilling experience in an application for a well driller's license as described in Subsection R655-4-3(3.2.4).

### ~~6.3 Apprenticeship Listing.~~

## **R655-4-6. Renewal of Well Driller's License, and Operator's Registration, and Apprenticeship Listings**

~~6.3.1 All apprentice's listings expire at 12 midnight on December 31 of the year in which they are issued.~~

~~6.3.2 A written application must be submitted to the Division of Water Rights to renew an apprenticeship listing.~~

## **R655-4-7. The Approval Process for Cathodic Protection Wells, Heating, or Cooling Exchange Wells and Monitor Wells**

### **7.1 General.**

Only cathodic protection wells, heating or cooling exchange wells, and monitor wells drilled and constructed to a depth of 30 feet or greater below natural ground surface require approval from the state engineer.

### **7.2 Approval to Construct or Replace.**

Approval to construct or replace cathodic protection wells, heating or cooling exchange wells, and monitor wells is issued by the state engineer's regional offices following review of written requests from the owner or applicant, federal or state agency or engineering representative. The requests for approval shall be made on forms provided by the state engineer entitled "Request for Non-Production Well Construction". The following information must be included on the form:

- a. General location or common description of the project.
- b. Specific course and distance locations from established government surveyed outside section corners or quarter corners.
- c. Total anticipated number of wells to be installed.
- d. Diameters, approximate depths and materials used in the wells.
- e. Projected start and completion dates.
- f. Name and license number of the driller contracted to install the wells.

There is no fee required to request approval to drill a cathodic protection well, a heating or cooling exchange well, or a monitor well. Upon written approval by the state engineer, the project will be assigned an approved authorization number which will be referenced on all start cards and official well driller's reports.

## **R655-4-8. General Requirements.**

### **8.1 Standards.**

- 8.1.1 In some locations, the compliance with the following minimum standards will not result in a well being free from pollution or from being a source of subsurface leakage, waste, or contamination of the groundwater resource. Since it is impractical to attempt to prepare standards for every conceivable situation, the well driller shall judge when to construct wells under more stringent standards when such precautions are necessary to protect the groundwater supply and those using the well in question. Other state and local regulations pertaining to well drilling and construction, groundwater protection, and water quality regulations may exist that are either more stringent than these rules or that specifically apply to a given situation. It is the well driller's responsibility to understand and apply other regulations as applicable.

### **8.2 Well Site Locations.**

- 8.2.1 Well site locations are described by course and distance from outside section corners or quarter corners (based on a Section/Township/Range Cadastral System) on all state engineer authorizations to drill (Start Cards). However, the licensee should also be familiar with local zoning ordinances, or county boards of health requirements which may limit or restrict the actual well location and construction in relationship to existing or proposed concentrated sources of pollution or contamination such as septic tanks, drain fields, sewer lines, stock corrals, feed lots, etc. The licensee should also be familiar with the Utah Underground Facilities Act (Section 54-8a of the Utah Code Annotated 1953 as amended) which requires subsurface excavators (including well drilling) to notify operators of underground utilities prior to any subsurface excavation. Information on this requirement can be found by calling (800)662-4111.
- 8.2.2 The driller shall check the drilling location to see if it generally matches the state-approved location listed on the Driller's Start Card. If the actual drilling location is significantly different than the Start Card location, the driller shall indicate the difference on the Well Log.

### **8.3 Unusual Conditions.**

- 8.3.1 If unusual conditions occur at a well site and compliance with these rules and standards will not result in a satisfactory well or protection to the groundwater supply, a licensed water well driller shall request that special standards be prescribed for a particular well. The request for special standards shall be in writing and shall set forth the location of the well, the name of the owner, the unusual conditions existing at the well site, the reasons that compliance with the rules and minimum standards will not result in a satisfactory well, and the proposed standards that the licensed water well driller believes will be more adequate for this particular well. If the state engineer finds that the proposed changes are in the best interest of the public, he will approve the proposed

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changes by assigning special standards for the particular well under consideration.



## **R655-4-9. Well Drilling and Construction Requirements**

### **9.0 General.**

Figures 1 through 5 are used to illustrate typical well construction standards. Figure 1 illustrates the typical construction of a drilled well with driven casing such as a well drilled using the cable tool method or air rotary with a drill-through casing driver. Figure 2 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed without the use of surface casing. Figure 3 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed with the use of surface casing. Figure 4 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed completed in stratified formations in which poor formation material or poor quality water is encountered. Figure 5 illustrates the typical construction of a well completed with PVC or nonmetallic casing.

### **9.1 Approved Products, Materials, and Procedures.**

9.1.1 Any product, material or procedure designed for use in the drilling, construction, cleaning, renovation, development or abandonment of water or monitor wells, which has received certification and approval for its intended use by the National Sanitation Foundation (NSF) under ANSI/NSF Standard 60 or 61, the American Society for Testing Materials (ASTM), the American Water Works Association (AWWA) or the American National Standards Institute (ANSI) may be utilized. Other products, materials or procedures may also be utilized for their intended purpose upon manufacturers certification that they meet or exceed the standards or certifications referred to in this Section.

### **9.2 Well Casing - General**

- 9.2.1 **Drillers Responsibility.** It shall be the sole responsibility of the well driller to determine the suitability of any type of well casing for the particular well being constructed, in accordance with these minimum requirements.
- 9.2.2 **Casing Stick-up.** The well casing shall extend a minimum of 18 inches above finished ground level and the natural ground surface should slope away from the casing. A sanitary, weatherproof seal or a completely welded cap shall be placed on the top of the well casing to prevent contamination of the well. If a vent is placed in the cap, it shall be properly screened to prevent access to the well by debris, insects, or other animals.
- 9.2.3 **Steel Casing:** All steel casing installed in Utah shall be in new or like-new condition, being free from pits or breaks, and shall meet the minimum specifications listed in Table 2 of these rules. In order to utilize steel well casing that does not fall within the categories specified in Table 2, the driller shall receive written approval from the state engineer. All steel casing installed in Utah shall meet or exceed the minimum ASTM, ANSI, or AWWA standards for steel pipe as described in Section 9.1. Applicable standards (most recent revisions) may include:

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ANSI/AWWA A100–AWWA Standard for Water Wells.

ANSI/ASTM A53–Standard Specifications for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

ANSI/ASTM A139–Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and over).

ANSI/ASTM A606–Standard Specification for Steel, Sheet, and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

ANSI/AWWA C200–Standard for Steel Water Pipe–6 in. and Larger.

API Spec.5L–Specification for Liner Pipe.

ASTM A778–Standard Specifications for Welded, Unannealed Austenitic Stainless Steel Tubular Products.

ASTM A252–Standard Specification for Welded and Seamless Steel Pipe Piles.

**TABLE 2**  
**MINIMUM WALL THICKNESS FOR STEEL WELL CASING**

<b>Depth</b>								
Nominal Casing Diameter (in)	0 to 200 (ft)	200 to 300 (ft)	300 to 400 (ft)	400 to 600 (ft)	600 to 800 (ft)	800 to 1000 (ft)	1000 to 1500 (ft)	1500 to 2000 (ft)
2	.154	.154	.154	.154	.154	.154	...	...
3	.216	.216	.216	.216	.216	.216	...	...
4	.237	.237	.237	.237	.237	.237	.237	.237
5	.250	.250	.250	.250	.250	.250	.250	.250
6	.250	.250	.250	.250	.250	.250	.250	.250
8	.250	.250	.250	.250	.250	.250	.250	.250
10	.250	.250	.250	.250	.250	.250	.312 <del>3</del>	.312 <del>3</del>
12	.250	.250	.250	.250	.250	.250	.312 <del>3</del>	.312 <del>3</del>
14	.250	.250	.250	.250	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>
16	.250	.250	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.375	.375
18	.250	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.375	.375	.375	.438
20	.250	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.375	.375	.375	.438
22	.312 <del>3</del>	.312 <del>3</del>	.312 <del>3</del>	.375	.375	.375	.375	.438
24	.312 <del>3</del>	.312 <del>3</del>	.375	.375	.375	.438	...	...
30	.312 <del>3</del>	.375	.375	.438	.438	.500	...	...

Note: Minimum wall thickness in inches.

## **R655-4-9. Well Drilling and Construction Requirements**

### **9.2.4 Plastic and Other Non-metallic Casing.**

9.2.4.1 Materials. PVC, SR, ABS, or other types of non-metallic well casing and screen may be installed in Utah upon obtaining permission of the well owner. Plastic well casing and screen shall be manufactured and installed to conform with The American National Standards Institute (ANSI) or the American Society for Testing and Materials (ASTM) Standard F 480 (most recent version), which are incorporated by reference to these rules. Casing and screen meeting this standard is normally marked "WELL CASING" and with the ANSI/ASTM designation "F 480-95 (or most recent version), SDR-17 (or 13.5)". All plastic casing and screen for use in potable water supplies shall be manufactured to be acceptable to the American National Standards Institute/National Sanitation Foundation (NSF) standard 61. Other types of plastic casings and screens may be installed upon manufacturers certification that such casing meets or exceeds the above described ASTM/SDR specification or ANSI/NSF approval.

9.2.4.2 Minimum Wall Thickness and Depth Requirements. PVC well casing and screen with an outside diameter equal to or less than four and one half (4.5) inches shall meet the minimum wall thickness required under ASTM Standard F480 (most recent version) SDR 21 or a Schedule 40 designation. PVC well casing and screen with an outside diameter greater than ~~of~~ four and one half (4.5) inches ~~or greater~~ shall meet the minimum wall thickness required under ASTM Standard F480 (most recent version) SDR 17 or a Schedule 80 designation. Additionally, caution should be used whenever other than factory slots or perforations are added to PVC well casing. The installation of hand cut slots or perforations significantly reduces the collapse strength tolerances of unaltered casings. The depth at which plastic casing and screen is placed in a well shall conform to the minimum requirements and restrictions as outlined in ASTM Standard F-480 (most recent version).

9.2.4.3 Fiberglass Casing. Fiberglass reinforced plastic well casings and screens may be installed in wells upon obtaining permission of the well owner. All fiberglass casing or screens installed in wells for use in potable water supplies shall be manufactured to be acceptable by ANSI/NSF Standard 61.

9.2.4.4 Driving Non-metallic Casing. Non-metallic casing shall not be driven or dropped and may only be installed in an oversized borehole.

9.2.4.5 Protective Casing. If plastic or other non-metallic casing is utilized, the driller shall install a protective steel casing which complies with the provisions of Section 9.2.3 or an equivalent protective covering approved by the state engineer over and around the well casing at ground surface to a depth of at least two and one half (2.5) feet. If a pitless adapter is installed on the well, the bottom of the protective cover shall be placed above the pitless adapter/well connection. If the pitless adapter is placed in the protective

## **R655-4-9. Well Drilling and Construction Requirements**

casing, the protective casing shall extend below the pitless entrance in the well casing and be sealed both on the outside of the protective casing and between the protective casing and well casing. The ~~steel casing~~ protective cover shall be sealed in the borehole in accordance with the requirements of Section 9.4. The annular space between the ~~steel~~ protective ~~casing~~ cover and non-metallic casing shall also be sealed with acceptable materials in accordance with Section 9.4. A sanitary, weather-tight seal or a completely welded cap shall be placed on top of the protective cover, thus enclosing the well itself. If the sanitary seal is vented, screens shall be placed in the vent to prevent debris insects, and other animals from entering the well. This protective casing requirement does not apply to monitor wells. Figure 5 depicts this requirement.

### **9.3 Casing Joints.**

- 9.3.1 General. All well casing joints shall be made water tight. In instances in which a reduction in casing diameter is made, there shall be enough overlap of the casings to prevent misalignment and to insure the making of an adequate seal in the annular space between casings to prevent the movement of unstable sediment or formation material into the well, in addition to preventing the degradation of the water supply by the migration of inferior quality water through the annular space between the two casings.
- 9.3.2 Steel Casing. All steel casing shall be screw-coupled or welded. If the joints are welded, the weld shall be at least as thick as the wall thickness of the casing and shall consist of at least two beads for the full circumference of the joint. Spot welding of joints is prohibited.
- 9.3.3 Plastic Casing. All plastic well casing shall be mechanically screw coupled, chemically welded, cam-locked or lug coupled to provide water tight joints as per ANSI/ASTM F480 (most recent version). Metal screws driven into casing joints shall not be long enough to penetrate the inside surface of the casing. Metal screws should be used only when surrounding air temperatures are below 50 degrees Fahrenheit (F) which retards the normal setting of the cement.

### **9.4 Surface Seals and Interval Seals - General**

- 9.4.1 General. Before the drill rig is removed from the drill site of a well, a surface seal shall be installed. Well casings shall be sealed to prevent the possible downward movement of contaminated surface waters in the annular space around the well casing. The seal shall also prevent the upward movement of artesian waters within the annular space around the well casing. The sealing is also to prevent the movement of groundwater either upward or downward from zones that have been cased out of the well due to poor water quality or other reasons. The following surface seal requirements apply equally to rotary drilled, cable tool drilled, bored, jetted, augered, and driven wells unless otherwise specified.

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### **9.4.2 Seal Material.**

9.4.2.1 General. The seal material shall consist of neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout as defined in R655-4-2. Use of sealing materials other than those listed above must be approved by the state engineer. Bentonite drilling fluid (mud), dry drilling bentonite, or drill cuttings are not an acceptable bentonite grout or sealing material. In no case shall drilling fluid (mud), drill cuttings, drill chips, or puddling clay be used, or allowed to fill, partially fill, or fall into the required sealing interval of a well during construction of the well. All hydrated sealing materials shall be placed by tremie pipe, pumping, or pressure from the bottom of the seal interval upwards in one continuous operation when placed below a depth of 30 feet or when placed below static groundwater level. Portland Cement grouts must be allowed to cure a minimum of 72 hours for Type I-II cement or 36 hours for Type III cement before well drilling, construction, or testing may be resumed. The volume of annular space in the seal interval shall be calculated by the driller to determine the estimated volume of seal material required to seal the annular space. The driller shall place at least the volume of material equal to the volume of annular space, thus ensuring that a continuous seal is placed. The driller shall maintain the well casing centered in the borehole during seal placement using centralizers or other means to ensure that the seal is placed radially and vertically continuous.

9.4.2.2 Bentonite Grout. Bentonite used to prepare grout for sealing shall have the ability to gel; not separate into water and solid materials after it gels; have a hydraulic conductivity or permeability value of  $10^{-7}$  centimeters per second or less; contain at least 20 percent solids by weight of bentonite, and have a fluid weight of 9.5 pounds per gallon or greater and be specifically designed for the purpose of sealing. Bentonite or polymer drilling fluid (mud) does not meet the definition of a grout with respect to density, gel strength, and solids content and shall not be used for sealing purposes. At no time shall bentonite grout contain materials that are toxic, polluting, develop odor or color changes, or serve as a micro-bacterial nutrient. All bentonite grout shall be prepared and installed according to the manufacturer's instructions. All additives must be certified by a recognized certification authority such as NSF.

9.4.2.3 Unhydrated Bentonite. Unhydrated bentonite (e.g., granular, tabular, pelletized, or chip bentonite) may be used in the construction of well seals above a depth of 50 feet. Unhydrated bentonite can be placed below a depth of 50 feet when placed inside the annulus of two casings or when placed using a tremie pipe. The bentonite material shall be specifically designed for well sealing and be within industry tolerances. All unhydrated bentonite used for sealing must be free of organic polymers and other contamination. Placement of bentonite shall conform to the manufacturer's specifications and

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instructions and result in a seal free of voids or bridges. Granular or powered bentonite shall not be placed under water by gravity feeding from the surface. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation.

### 9.4.3 Seal and Unperforated Casing Placement.

9.4.3.1 General Seal Requirements. Figure 1 illustrates the construction of a surface seal for a typical well. The surface seal must be placed in an annular space that has a minimum diameter of four (4) inches larger than the nominal size of the permanent well casing (This amounts to a 2-inch annulus). The surface seal must extend from land surface to a minimum depth of 30 feet. The completed surface seal must fully surround the permanent well casing, must be evenly distributed, free of voids, and extend to undisturbed or recompacted soil. ~~A surface casing with a minimum depth of 30 feet and a minimum nominal diameter of four (4) inches greater than the permanent casing may be used in unconsolidated formations such as gravels, sands, or other unstable conditions when the use of drilling fluid or other means of keeping the borehole open are not employed.~~ In unconsolidated formations such as gravels, sands, or other unstable conditions when the use of drilling fluid or other means of keeping the borehole open are not employed, either a temporary surface casing with a minimum depth of 30 feet and a minimum nominal diameter of four (4) inches greater than the permanent casing shall be utilized to ensure proper seal placement or the well driller shall notify the state engineer's office by telephone at least 24 hours prior to surface seal placement to provide an opportunity for the state engineer's office to inspect the seal. If a temporary surface casing is utilized, the surface casing shall be removed in conjunction with the placement of the seal. Alternatively, the surface casing may be sealed permanently in place to a depth of 30 feet with a minimum 2-inch annular seal between the surface casing and borehole wall. If the surface casing is to be removed, the surface casing shall be withdrawn as sealing material is placed between the permanent well casing and borehole wall. The sealing material shall be kept at a sufficient height above the bottom of the temporary surface casing as it is withdrawn to prevent caving of the borehole wall. If the temporary conductor casing is driven in place without a 2-inch annular seal between the surface casing and borehole wall, the surface casing may be left in place in the borehole only if it is impossible to remove because of unforeseen conditions and not because of inadequate drilling equipment, or if the removal will seriously jeopardize the integrity of the well and the integrity of subsurface barriers to pollutants or contaminant movement. The temporary surface casing can only be left in place without a sufficient 2-inch annular seal as describe above with the approval of the state engineer on a case by case basis. If the surface casing is left in place, it shall be perforated to allow seal material to penetrate through the casing and into

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the formation and annular space between the surface casing and borehole wall. Unhydrated bentonite shall not be used to construct the surface seal when the surface casing is left in place. Grout seal materials must be used to construct the surface seal when the surface casing is left in place. The grout must be placed with sufficient pressure to force the grout through the surface casing perforations and into the annular space between the surface casing and borehole wall and into the formation. Surface seals and unperforated casing shall be installed in wells located in unconsolidated formation such as sand and gravel with minor clay or confining units; unconsolidated formation consisting of stratified layers of materials such as sand, gravel, and clay or other confining units; and consolidated formations according to the following procedures.

9.4.3.2 Unconsolidated Formation without Significant Confining Units. This includes wells that penetrate an aquifer overlain by unconsolidated formations such as sand and gravel without significant clay beds (at least six feet thick) or other confining formations. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet. Permanent unperforated casing shall extend at least to a depth of 30 feet and also extend below the lowest anticipated pumping level. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Section 9.2 unless the casing is installed as a liner inside a larger diameter approved casing.

9.4.3.3 Unconsolidated Formation with Significant Confining Units. This includes wells that penetrate an aquifer overlain by clay or other confining formations that are at least six (6) feet thick. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five (5) feet into the confining unit above the water bearing formation. Unperforated casing shall extend from ground surface to at least 30 feet and to the bottom of the confining unit overlying the water bearing formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Section 9.2 unless the casing is installed as a liner inside a larger diameter approved casing.

9.4.3.4 Consolidated Formation. This includes drilled wells that penetrate an aquifer, either within or overlain by a consolidated formation. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five (5) feet into competent consolidated formation. Unperforated permanent casing shall be installed to extend to a depth of at least 30 feet and the lower part of the casing shall be driven and sealed at least five (5) feet into the consolidated formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated

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casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Section 9.2 unless the casing is installed as a liner inside a larger diameter approved casing.

9.4.3.5 Sealing Artesian Wells. Unperforated well casing shall extend into the confining stratum overlying the artesian zone, and shall be adequately sealed into the confining stratum to prevent both surface and subsurface leakage from the artesian zone. If leaks occur around the well casing or adjacent to the well, the well shall be completed with the seals, packers, or casing necessary to eliminate the leakage. The driller shall not move the drilling rig from the well site until leakage is completely stopped, unless authority for temporary removal of the drilling rig is granted by the state engineer, or when loss of life or property is imminent. If the well flows naturally at land surface due to artesian pressure, the well shall be equipped with a control valve so that the flow can be completely stopped. The control valve must be available for inspection by the state engineer at all times.

9.4.4 Interval Seals: Formations containing undesirable materials (e.g., fine sand and silt that can damage pumping equipment and result in turbid water), contaminated groundwater, or poor quality groundwater must be sealed off so that the unfavorable formation cannot contribute to the performance and quality of the well. These zones must also be sealed to eliminate the potential of cross contamination or commingling between two aquifers of differing quality. Figure 4 illustrates this situation.

9.4.5 Other Sealing Methods: In wells where the above-described methods of well sealing do not apply, special sealing procedures can be approved by the state engineer upon written request by the licensed well driller.

9.5 Special Requirements for Oversized and Gravel Packed Wells. This section applies to wells in which casing is installed in an open borehole without driving or drilling in the casing and an annular space is left between the borehole wall and well casing (e.g., mud rotary wells, flooded reverse circulation wells, air rotary wells in open bedrock).

9.5.1 Oversized Borehole. The diameter of the borehole shall be at least four (4) inches larger than the outside diameter of the well casing to be installed to allow for proper placement of the gravel pack and/or formation stabilizer and adequate clearance for grouting and surface seal installations. In order to accept a smaller diameter casing in any oversized borehole penetrating unconsolidated or stratified formations, the annular space must be sealed in accordance with Section 9.4. In order to minimize the risk of: 1) borehole caving or collapse; 2) casing failure or collapse; or 3) axial distortion of the casing, it is recommended that the entire annular space in an oversized borehole between the casing and borehole wall be filled with formation stabilizer such as approved seal material,



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gravel pack, filter material or other state engineer-approved materials. Well casing placed in an oversized borehole should be suspended at the ground surface until all formation stabilizer material is placed in order to reduce axial distortion of the casing if it is allowed to rest on the bottom of an open oversized borehole. In order to accept a smaller diameter casing, the annular space in an oversized borehole penetrating unconsolidated formations (with no confining layer) must be sealed in accordance with Section 9.4 to a depth of at least 30 feet or from static water level to ground surface, whichever is deeper. The annular space in an oversized borehole penetrating stratified or consolidated formations must be sealed in accordance with Section 9.4 to a depth of at least 30 feet or five (5) feet into an impervious strata (e.g., clay) or competent consolidated formation overlying the water producing zones back to ground surface, whichever is deeper. Especially in the case of an oversized borehole, the requirements of Section 9.4.4 regarding interval sealing must be followed.

- 9.5.2 Gravel Pack or Filter Material. The gravel pack or filter material shall consist of clean, well-rounded, chemically stable grains that are smooth and uniform. The filter material should not contain more than 2% by weight of thin, flat, or elongated pieces and should not contain organic impurities or contaminants of any kind. In order to assure that no contamination is introduced into the well via the gravel pack, the gravel pack must be washed with a minimum 100 ppm solution of chlorinated water or dry hypochlorite mixed with the gravel pack at the surface before it is introduced into the well (See Table 3 of these rules for required amount of chlorine material).
- 9.5.3 Placement of Filter Material. All filter material shall be placed using a method that through common usage has been shown to minimize a) bridging of the material between the borehole and the casing, and b) excessive segregation of the material after it has been introduced into the annulus and before it settles into place. It is not acceptable to place filter material by pouring from the ground surface unless proper sounding devices are utilized to measure dynamic filter depth, evaluate pour rate, and minimize bridging and formation of voids.
- 9.5.4 No Surface Casing Used. If no permanent surface casing is installed, neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite seal shall be installed in accordance with Section 9.4. Figure 2 of these rules illustrates the construction of a typical well of this type.
- 9.5.5 Surface Casing Used. If permanent surface casing is installed, it shall be unperforated and installed and sealed in accordance with Section 9.4 as depicted in Figure 3 of these rules. After the gravel pack has been installed between the surface casing and the well casing, the annular space between the two casings shall be sealed by either welding a water-tight steel cap between the two casings at land surface or filling the annular space between the two casings with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite from at least 50 feet to the surface and in accordance with Section 9.4. If a hole will

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be created in the surface casing in order to install a pitless adapter into the well casing, the annular space between the surface casing and well casing shall be sealed with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite and a waterproof cap sealing the two casings at the surface by itself is unacceptable. Moreover in this case, the annular space between the surface casing and well casing must be at least 2 inches in order to facilitate seal placement.

- 9.5.6 Gravel Feed Pipe. If a gravel feed pipe, used to add gravel to the gravel pack after well completion, is installed, the diameter of the borehole in the sealing interval must be at least four (4) inches in diameter greater than the permanent casing plus the diameter of the gravel feed pipe. The gravel feed pipe must be completely surrounded by the seal. The gravel feed pipe must extend at least 18 inches above ground and must be sealed at the top with a watertight cap or plug (see Figure 2).

### 9.6 Protection of the Aquifer.

- 9.6.1 Drilling Fluids and LCMs. The well driller shall take due care to protect the producing aquifer from clogging or contamination. Organic substances shall not be introduced into the well or borehole during drilling or construction. Every effort shall be made to remove all substances and materials introduced into the aquifer or aquifers during well construction. "Substances and materials" shall mean all drilling fluids, filter cake, and any other ~~organic or organic or~~ inorganic substances added to the drilling fluid that may seal or clog the aquifer. The introduction of lost circulation materials (LCM's) during the drilling process shall be limited to those products which will not present a potential medium for bacterial growth or contamination. Only LCM's which are non-organic-~~or biodegradable~~, such as "rock wool" consisting of spun calcium carbonate, which can be safely broken down and removed from the borehole, may be utilized. This is especially important in the construction of wells designed to be used as a public water system supply.
- 9.6.2 Containment of Drilling Fluid. Drilling or circulating fluid introduced into the drilling process shall be contained in a manner to prevent surface or subsurface contamination and to prevent degradation of natural or man-made water courses or impoundments. Rules regarding the discharges to waters of the state are promulgated under R317-8-2 of the Utah Administrative Code and regulated by the Utah Division of Water Quality (Tel. 801-536-6146). Pollution of waters of the state is a violation of the Utah Water Quality Act, Utah Code Annotated 19-5.
- 9.6.3 Mineralized, Contaminated or Polluted Water. Whenever a water bearing stratum that contains nonpotable mineralized, contaminated or polluted water is encountered, the stratum shall be adequately sealed off so that contamination or co-mingling of the overlying or underlying groundwater zones will not occur

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(See Figure 4).

- 9.6.4 Drilling Equipment. All tools, drilling equipment, and materials used to drill a well shall be free of contaminants prior to beginning well construction. Contaminants include lubricants, fuel, bacteria, etc. that will reduce the well efficiency, and any other item(s) that will be harmful to public health and/or the resource or reduce the life of the water well. It is recommended that excess lubricants placed on drilling equipment be wiped clean prior to insertion into the borehole.
- 9.6.5 Well Disinfection and Chlorination of Water. No contaminated or untreated water shall be placed in a well during construction. Water should be obtained from a chlorinated municipal system. Where this is not possible, the water must be treated to give 100 parts per million free chlorine residual. Upon completion of a well or work on a well, the driller shall disinfect the well using accepted disinfection procedures to give 100 parts per million free chlorine residual in the well water. Table 3 provides the amount of common laundry bleach or dry powder hypochlorite required per 100 gallons of water or 100 feet linear casing volume of water to mix a 100 parts per million solution. Additional recommendations and guidelines for water well system disinfection are available from the state engineer upon request.

**TABLE 3**  
**AMOUNT OF HYPOCHLORITE FOR EACH 100 FEET OF WATER**  
**STANDING IN WELL (100 ppm solution)**

Well Diameter (inches)	5.25% Solution (cups)	25% Powder (ounces)	70% Powder (ounces)**
2	0.50	1.00	0.50
4	2.25	3.50	1.50
6	5.00	8.00	3.00
8	8.50	14.50	5.50
10	13.00	22.50	8.50
12	19.00	32.50	12.00
14	26.00	44.50	16.50
16	34.00	58.00	26.00
20	53.00	90.50	33.00
For Every 100 gal. of water add:	3.50	5.50	2.00

NOTES: \* Common Laundry Bleach  
\*\* High Test Hypochlorite

### 9.7 Special Requirements

## **R655-4-9. Well Drilling and Construction Requirements**

- 9.7.1 Explosives. Explosives used in well construction shall not be detonated within the section of casing designed or expected to serve as the surface seal of the completed well, whether or not the surface seal has been placed. If explosives are used in the construction of a well, their use shall be reported on the official well log. In no case shall explosives, other than explosive shot perforators specifically designed to perforate steel casing, be detonated inside the well casing or liner pipe.
- 9.7.2 Access Port. Every well shall be equipped with a usable access port so that the position of the water level, or pressure head, in the well can be measured at all times.
- 9.7.3 Completion or Abandonment. A licensed driller shall not remove his drill rig from a well site unless the well is completed or abandoned. Completion of a well shall include all surface seals, gravel packs or curbs required. Dry boreholes, or otherwise unsuccessful attempts at completing a well, shall be properly abandoned in accordance with R655-4-12. Upon completion, all wells shall be equipped with a watertight, tamper-resistant casing cap or sanitary seal.
- 9.7.4 Surface Security. If it becomes necessary for the driller to temporarily discontinue the drilling operation before completion of the well or otherwise leave the well or borehole unattended, the well and/or borehole must be covered securely to prevent contaminants from entering the casing or borehole and rendered secure against entry by children, vandals, domestic animals, and wildlife.
- 9.7.5 Pitless Adapters. Pitless adapters or units are acceptable to use with steel well casing as long as they are installed in accordance with manufacturers recommendations and specifications. The pitless adaptor, including the cap or cover, casing extension, and other attachments, must be so designed and constructed to be water tight and to prevent contamination of the potable water supply from external sources. Pitless adapters or units are not recommended to be mounted on PVC well casing. If a pitless adapter is to be used with PVC casing, it should be designed for use with PVC casing, and the driller should ensure that the weight of the pump and column do not exceed the strength of the PVC well casing.
- 9.7.6 Hydraulic Fracturing. The hydraulic fracturing pressure shall be transmitted through a drill string and shall not be transmitted to the well casing. Hydraulic fracturing intervals shall be at least 20 feet below the bottom of the permanent casing of a well. All hydraulic fracturing equipment shall be thoroughly disinfected with a 100 part per million chlorine solution prior to insertion into the well. The driller shall include the appropriate hydraulic fracturing information on the well log including methods, materials, maximum pressures, location of packers, and initial/final yields.

## **R655-4-9. Well Drilling and Construction Requirements**

- 9.7.7 Static Water Level, Well Development, and Well Yield. To fulfill the requirements of R-655-4-4.5.2, new wells designed to produce water shall be developed to remove drill cuttings, drilling mud, or other materials introduced into the well during construction and to restore the natural groundwater flow to the well to the extent possible. After a water production well is developed, a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Following development and testing, the static water level in the well should also be measured. Static water level, well development information, and well yield information shall be noted on the official submittal of the Well Log by the well driller.

## **R655-4-10 Special Wells**

### **10.1 Construction Standards for Special Wells.**

- 10.1.1 General. The construction standards outlined in R655-4-9 are meant to serve as minimum acceptable construction standards. Certain types of wells such as cathodic protection wells, heating or cooling exchange wells, recharge and recovery wells, and public supply wells require special construction standards that are addressed in this section or in rules promulgated by other regulating agencies. At a minimum, when constructing special wells as listed above, the well shall be constructed by a licensed well driller, and the minimum construction standards of R655-4-9 shall be followed in addition to the following special standards.
- 10.1.2 Public Water Supply Wells. Public water supply wells are subject to the minimum construction standards outlined in R655-4-9 in addition to the requirements established by the Department of Environmental Quality, Division of Drinking Water under Sections R309-204 and R309-113. Plans and specifications for a public supply well must be reviewed and approved by the Division of Drinking Water before the well is drilled. These plans and specifications shall include the procedures, practices, and materials used to drill, construct, seal, develop, clean, disinfect, and test the public supply well. A Preliminary Evaluation Report describing the potential vulnerability and protection strategies of the new well to contamination must also be submitted and approved prior to drilling. A representative of the Division of Drinking Water must be present at the time the surface grout seal is placed in all public supply wells, so that the placement of the seal can be certified. In order to assure that a representative will be available, and to avoid down-time waiting for a representative, notice should be given several days in advance of the projected surface grout seal placement. When the time and date for the surface grout seal installation are confirmed a definite appointment should be made with the representative of the Division of Drinking Water to witness the grout seal placement by calling (801) 536-4200. The licensed driller shall have available a copy of the start card relating to the well and provide that information to the inspecting representative at the time of the surface grout seal installation and inspection.
- 10.1.3 Cathodic Protection Well Construction. Cathodic protection wells shall be constructed in accordance with the casing, joint, surface seal, and other applicable requirements outlined in R655-4-9. Any annular space existing between the base of the annular surface seal and the top of the anode and conductive fill interval shall be filled with appropriate fill or sealing material. Fill material shall consist of washed granular material such as sand, pea gravel, or sealing material. Fill material shall not be subject to decomposition or consolidation and shall be free of pollutants and contaminants. Fill material shall not be toxic or contain drill cuttings or drilling mud. Additional sealing material shall be placed below the minimum depth of the annular surface seal, as needed, to prevent the cross-connection and commingling of separate aquifers and water

## R655-4-10 Special Wells

bearing zones. Vent pipes, anode access tubing, and any other tubular materials (i.e., the outermost casing) that pass through the interval to be filled and sealed are considered casing for the purposes of these standards and shall meet the requirements of Sections R655-4-9.2 and 9.3. Cathodic protection well casing shall be at least 2 inches in internal diameter to facilitate eventual well abandonment. Figure 6 illustrates the construction of a typical cathodic protection well.

- 10.1.4 Heating or Cooling Exchange Wells. Wells or boreholes utilized for heat exchange or thermal heating, which are 30 feet or greater in depth and encounter formations containing groundwater, must be drilled by a licensed driller and the owner or applicant must have an approved application for that specific purpose as outlined in R655-4-7. Wells or boreholes installed for heat or thermal exchange process must comply with the minimum construction standards of R655-4-9. If a separate well or borehole is required for re-injection purposes, it must also comply with these standards and the groundwater must be injected into the same water bearing zones as from which it is initially withdrawn, and a non-consumptive use water right is required. The quality and quantity of groundwater shall not be diminished or degraded upon re-injection. The rules herein pertain only to the heating and cooling exchange well constructed to a depth greater than 30 feet and are not intended to regulate the incidental work that may occur up to the well such as plumbing, electrical, piping, trenching, and backfilling activities.
- 10.1.5 Recharge and Recovery Wells. Any well drilled under the provisions of Section 73-3b (Groundwater Recharge and Recovery Act) shall be constructed in a manner consistent with these rules and shall be drilled by a currently licensed driller. Special rules regarding the injection of water into the ground are also promulgated under the jurisdiction of the Utah Department of Environmental Quality, Division of Water Quality (Section R317-7 “Underground Injection Control Program” of the Utah Administrative Code) and must be followed in conjunction with the Water Well Drilling rules.

## **R655-4-11. Deepening, Rehabilitation, and Renovation of Wells**

### **11.1 Sealing of Casing.**

- 11.1.1 If in the repair of a drilled well, the old casing is withdrawn, the well shall be recased and resealed in accordance with the rules provided in Section R655-4-9.4.

### **11.2 Inner Casing.**

- 11.2.1 If an inner casing is installed to prevent leakage of undesirable water into a well, the space between the two well casings shall be completely sealed using packers, casing swedging, pressure grouting, etc., to prevent the movement of water between the casings.

### **11.3 Outer Casing.**

- 11.3.1 If the "over-drive" method is used to eliminate leakage around an existing well, the casing driven over the well shall meet the minimum specifications listed in Sections R655-4-9.2 and 9.3.

### **11.4 Artesian Wells.**

- 11.4.1 If upon deepening an existing well, an artesian zone is encountered, the well shall be cased and completed as provided in R655-4-9.

### **11.5 Drilling in a Dug Well.**

- 11.5.1 A drilled well may be constructed through an existing dug well provided that:

- 11.5.1.1 Unperforated Casing Requirements. An unperforated section of well casing extends from a depth of at least ten (10) feet below the bottom of the dug well and at least 20 feet below land surface to above the maximum static water level in the dug well.

- 11.5.1.2 Seal Required. A two foot thick seal of neat cement grout, sand cement grout, or bentonite grout is placed in the bottom of the dug well so as to prevent the direct movement of water from the dug well into the drilled well.

- 11.5.1.3 Test of Seal. The drilled well shall be pumped or bailed to determine whether the seal described in Section 11.5.2 is adequate to prevent movement of water from the dug well into the drilled well. If the seal leaks, additional sealing and testing shall be performed until a watertight seal is obtained.

### **11.6 Well Rehabilitation and Cleaning.**

- 11.6.1 Tools used to rehabilitate or clean a well shall be cleaned, disinfected, and free of contamination prior to placement in a well.



## **R655-4-11. Deepening, Rehabilitation, and Renovation of Wells**

- 11.6.2 The driller shall use rehabilitation and cleaning tools properly so as not to permanently damage the well or aquifer. If the surface seal is damaged or destroyed in the process of rehabilitation or cleaning, the driller shall repair the surface seal to the standards set forth in Section R655-4-9.4.
- 11.6.3 Debris, sediment, and other materials displaced inside the well and surrounding aquifer as a result of rehabilitation or cleaning shall be completely removed by pumping, bailing, well development, or other approved methods.
- 11.6.4 Detergents, chlorine, acids, or other chemicals placed in wells for the purpose of increasing or restoring yield, shall be specifically designed for that purpose and used according to the manufacturer's recommendations.
- 11.6.5 Any renovation, rehabilitation, cleaning, or other work on a well that requires alteration of the well itself shall be conducted by a licensed well driller.
- 11.6.6 Following completion of deepening, renovation, rehabilitation, cleaning, or other work on a well, the well shall be properly disinfected in accordance with R655-4-9.6.5.

## **R655-4-12 Abandonment of Wells**

### **12.1 Temporary Abandonment.**

- 12.1.1 When any well is temporarily removed from service, the top of the well shall be sealed with a tamper resistant, water-tight cap or seal. If a well is in the process of being drilled and is temporarily abandoned, the well shall be sealed with a tamper resistant, water-tight cap or seal and a surface seal installed in accordance with Section R655-4-9.4. The well may be temporarily abandoned during construction for a maximum of 90 days. After the 90 day period, the temporarily abandoned well shall be permanently abandoned in accordance with the following requirements, and an official well abandonment report (abandonment log) must be submitted in compliance with Section R655-4-4.6.

### **12.2 Permanent Abandonment.**

- 12.2.1 The rules of this section apply to the abandonment of the type of wells listed in Section R655-4-1.2 including private water wells, public supply wells, monitor wells, cathodic protection wells, and heating or cooling exchange wells. A licensed driller shall notify the state engineer prior to commencing abandonment work and submit a complete and accurate abandonment log following abandonment work in accordance with Section R655-4-4.6 of these rules. Prior to commencing abandonment work, the driller shall obtain a copy of the well log of the well proposed to be abandoned from the well owner or the state engineer, if available, in order to determine the proper abandonment procedure. Any well that is to be permanently abandoned shall be completely filled in a manner to prevent vertical movement of water within the borehole as well as preventing the annular space surrounding the well casing from becoming a conduit for possible contamination of the groundwater supply. A well driller who wishes to abandon a well in a manner that does not comply with the provisions set forth in this Section must request approval from the state engineer.

### **12.3 License Required.**

- 12.3.1 Well abandonment shall be accomplished under the direct supervision of a currently licensed water well driller who shall be responsible for verification of the procedures and materials used.

### **12.4 Acceptable Materials.**

- 12.4.1 Neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout shall be used to abandon wells and boreholes. Other sealing materials or additives, such as fly ash, may be used in the preparation of grout upon approval of the state engineer. Drilling mud or drill cuttings shall not be used as any part of a sealing materials for well abandonment. The liquid phase of the abandonment fluid shall be water from a potable municipal system or disinfected in accordance with R655-4-9.6.5.

## **R655-4-12 Abandonment of Wells**

### **12.5 Placement of Materials.**

- 12.5.1 Neat cement and sand cement grout shall be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The sealing material shall be placed by the use of a grout pipe, tremie line, dump bailer or equivalent in order to avoid freefall, bridging, or dilution of the sealing materials or separation of aggregates from sealants. Sealing material shall not be installed by freefall (gravity) unless the interval to be sealed is dry and no deeper than 30 feet below ground surface. If the well to be abandoned is a flowing artesian well, the well may be pressure grouted from the surface. The well should be capped immediately after placement of seal materials to allow the seal material to set up and not flow out of the well.
- 12.5.2 Bentonite-based abandonment products shall be mixed and placed according to manufacturer's recommended procedures and result in a seal free of voids or bridges. Granular or powered bentonite shall not be placed under water. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation..
- 12.5.3 The uppermost ten (10) feet of the abandoned well casing or borehole shall consist of neat cement grout or sand cement grout.
- 12.5.4 Abandonment materials placed opposite any non-water bearing intervals or zones shall be at least as impervious as the formation or strata prior to penetration during the drilling process.
- 12.5.5 Prior to well or borehole abandonment, all pump equipment, piping, and other debris shall be removed to the extent possible. The well shall also be sounded immediately before it is plugged to make sure that no obstructions exist that will interfere with the filling and sealing. If the well contains lubricating oil that has leaked from a turbine shaft pump, it shall be removed from the well prior to abandonment and disposed of in accordance with applicable state and federal regulations.
- 12.5.6 Verification shall be made that the volume of sealing and fill material placed in a well during abandonment operations equals or exceeds the volume of the well or borehole to be filled and sealed.

### **12.6 Termination of Casing.**

- 12.6.1 The casings of wells to be abandoned shall be severed a minimum of two feet below either the natural ground surface adjacent to the well or at the collar of the hole, whichever is the lower elevation. A minimum of two (2) feet of compacted native material shall be placed above the abandoned well upon completion.

## **R655-4-12 Abandonment of Wells**

### **12.7 Abandonment of Artesian Wells.**

- 12.7.1 A neat cement grout, sand-cement grout, or concrete plug shall be placed in the confining stratum overlying the artesian zone so as to prevent subsurface leakage from the artesian zone. The remainder of the well shall be filled with sand-cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. The uppermost ten (10) feet of the well shall be abandoned as required in Section 12.5.3.

### **12.8 Abandonment of Drilled and Jetted Wells.**

- 12.8.1 A neat cement grout or sand cement grout plug shall be placed opposite all perforations, screens or openings in the well casing. The remainder of the well shall be filled with cement grout, neat cement, bentonite abandonment products, concrete, or bentonite slurry. The uppermost ten feet of the well shall be abandoned as required in Section 12.5.3.

### **12.9 Abandonment of Gravel Packed Wells.**

- 12.9.1 All gravel packed wells shall be pressure grouted throughout the perforated or screened section of the well. The remainder of the well shall be filled with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. The uppermost ten feet of the well shall be abandoned as required in Section 12.5.3.

### **12.10 Removal of Casing**

- 12.10.1 It is recommended that the well casing be removed during well abandonment, and when doing so, the abandonment materials shall be placed from the bottom of the well or borehole progressively upward as the casing is removed. The well shall be sealed with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. In the case of gravel packed wells, the entire gravel section shall be pressure grouted. The uppermost ten feet of the well shall be abandoned as required in Section 12.5.3.

### **12.11 Replacement Wells.**

- 12.11.1 Wells which are to be removed from operation and replaced by the drilling of a new well under an approved replacement application, shall be abandoned in a manner consistent with the provisions of R655-4-12 before the rig is removed from the site of the newly constructed replacement well, unless written authorization to remove the rig without abandonment is provided by the state engineer. Also refer to the requirements provided in Section R655-4-4.4.

### **12.12 Abandonment of Cathodic Protection Wells.**

## **R655-4-12 Abandonment of Wells**

- 12.12.1 The general requirements for permanent well abandonment in accordance with R655-4-12 shall be followed for the abandonment of cathodic protection wells.
- 12.12.1 A cathodic protection well shall be investigated before it is destroyed to determine its condition, details of its construction and whether conditions exist that will interfere with filling and sealing.
- 12.12.3 Casing, cables, anodes, granular backfill, conductive backfill, and sealing material shall be removed as needed, by re-drilling, if necessary, to the point needed to allow proper placement of abandonment material. Casing that cannot be removed shall be adequately perforated or punctured at specific intervals to allow pressure injection of sealing materials into granular backfill and all other voids that require sealing.

## **R655-4-13 Monitor Well Construction Standards**

### **13.1 Scope.**

- 13.1.1 Certain construction standards that apply to water wells also apply to monitor wells. Therefore, these monitoring well standards refer frequently to the water well standard sections of the rules. Standards that apply only to monitor wells, or that require emphasis, are discussed in this section. Figure 7 illustrates a schematic of an acceptable monitor well with an above-ground surface completion. Figure 8 illustrates a schematic of an acceptable monitor well with a flush-mount surface completion.
- 13.1.2 These standards are not intended as a complete manual for monitoring well construction, alteration, maintenance, and abandonment. These standards serve only as minimum statewide guidelines towards ensuring that monitor wells do not constitute a significant pathway for the movement of poor quality water, pollutants, or contaminants. These standards provide no assurance that a monitor well will perform a desired function. Ultimate responsibility for the design and performance of a monitoring well rests with the well owner and/or the owner's contractor, and/or technical representative(s). Most monitor well projects are the result of compliance with the Environmental Protection Agency (EPA), Federal Regulations such as the Resource Conservation & Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund"), or specific State Solid and Hazardous Waste requirements. The contracts governing their installation are tightly written containing specific requirements as to site location, materials used, sampling procedures and overall objectives. Therefore specific construction requirements for monitor well installation shall be governed by applicable contracts and regulations providing they meet or exceed state requirements and specifications. Guidelines and recommended practices dealing with the installation of monitor wells may be obtained from the state engineer upon request. Additional recommended information may be obtained from the Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), Groundwater Monitoring Enforcement and Compliance Document available from EPA's regional office in Denver, Colorado and from the Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells, available from the National Groundwater Association in Dublin, Ohio.

### **13.2 Installation and Construction.**

- 13.2.1 **Materials and Equipment Contaminant-Free.** All material used in the installation of monitor wells shall be contaminant-free when placed in the ground. Drilling equipment shall be clean and contaminant free in accordance with Section R655-4-9.6.4. During construction contaminated water should not be allowed to enter contaminant-free geologic formations or water bearing zones.
- 13.2.2 **Borehole Integrity.** Some minor cross-contamination may occur during the drilling process, but the integrity of the borehole and individual formations must

## **R655-4-13 Monitor Well Construction Standards**

then be safeguarded from permanent cross connection.

- 13.2.3 Casing and Screen. The well casing should be perforated or screened and filter packed with sand or gravel where necessary to provide adequate sample collection at depths where appropriate aquifer flow zones exist. The casing and screen selected shall not affect or interfere with the chemical, physical, radiological, or biological constituents of interest. Screens in the same well shall not be placed across separate water bearing zones in order to minimize interconnection, aquifer commingling, and cross contamination. Screens in a nested well can be placed in separate water bearing zones as long as the intervals between the water bearing zones are appropriately sealed and aquifer cross connection and commingling does not occur. Monitor well casing and screen shall conform to ASTM standards, or consist of at least 304 or 316 stainless steel, PTFE (Teflon), or Schedule 40 PVC casing.
- 13.2.4 Gravel/Filter Pack. If installed, the gravel or filter pack should generally extend two (2) feet to ten (10) feet above screened or perforated areas to prevent the migration of the sealing material from entering the zones being sampled. Gravel or filter pack material shall meet the requirements of Section R655-4-9.12.2. Gravel/filter pack for monitoring wells does not require disinfection. Drill cutting should not be placed into the open borehole annulus. The well driller shall ensure that a bridge or voids do not occur in the annular space during the placement of the gravel pack by means of a sounding device or other mechanism.
- 13.2.5 Annular Seal. All monitor wells constructed shall have a continuous surface seal, which seals the annular space between the borehole and the permanent casing, in accordance with the provisions in Section R655-4-9.4. The surface seal depth requirements of Section R655-4-9.4 do not apply to monitor wells. The surface seal may be more or less than 30 feet depending on the screen/perforation and/or gravel pack interval. Seals shall also be constructed to prevent interconnection and commingling of separate aquifers penetrated by the well, prevent migration of surface water and contamination into the well and aquifers, and shall provide casing stability. The seal shall have a minimum thickness of two inches, and shall extend from land surface to the top of the filter pack. After the permanent casing and filter pack (optional) has been set in final position, a layer of bentonite or fine sand (e.g., mortar sand) shall be placed on top of the filter pack to maintain separation between the seal material and the screened interval in order to insure that the seal placement will not interfere with the filter pack. The remaining annular space shall be filled to land surface in a continuous operation with unhydrated bentonite, neat cement grout, sand-cement grout, or bentonite grout. Only potable water should be used to hydrate any grout or slurry mixture. The completed annular space shall fully surround the permanent casing, be evenly distributed, free of voids, and extend from the permanent casing to undisturbed or recompacted soil. All sealing materials and placement methods shall conform to the standards in Section R655-4-9.4. The well driller shall ensure that a bridge or voids do not occur in the annular space

## **R655-4-13 Monitor Well Construction Standards**

during the placement of the seal.

- 13.2.6 Cuttings, Decon Water, Development Water, and Other IDW. Drill cuttings, decontamination (Decon) water, monitor well development water, and other investigation derived waste (IDW) shall be managed and disposed of in accordance with applicable state and federal environmental regulations. It is the responsibility of the driller to know and understand such requirements.

### **13.3 Minimum Surface Protection Requirements.**

- 13.3.1 If a well is cased with metal and completed above ground surface, a locking water resistant cap shall be installed on the top of the well.
- 13.3.2 If the well is not cased with metal and completed above ground surface, a protective metal casing shall be installed over and around the well. The protective casing shall be cemented at least two feet into the ground around the nonmetallic casing. A water tight cap shall be installed in the top of the well casing. A locking cap shall be installed on the top of the protective casing.
- 13.3.3 Monitor wells completed above ground and potentially accessible to vehicular damage shall be protected in the following manner. At least three metal posts, at least three inches in diameter, shall be cemented in place around the casing. Each post shall extend at least three feet above and two feet below ground surface. A concrete pad may be installed to add protection to the surface completion. If installed, the concrete pad shall be at least four (4) inches thick and shall slope to drain away from the well casing. The base shall extend at least two (2) feet laterally in all directions from the outside of the well boring. When a concrete pad is used, the well seal may be part of the concrete pad.
- 13.3.4 If the well is completed below land surface, a water tight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The monument and cover must be designed to withstand the maximum expected load.

### **13.4 Abandonment.**

- 13.4.1 Abandonment of monitor wells shall be completed in compliance with the provisions of R655-4-12. The provisions of R655-4-12 are not required for the permanent abandonment of monitor wells completed less than 30 feet below natural ground surface.



